

# **A Sustainable Roadmap for Fusion Propulsion Beginning with the Charger Facility**

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**Abstract.** The objective of this presentation is to offer a sustainable roadmap for fusion propulsion for deep space travel. First we briefly summarize the key arguments for fusion, and justify the choice of the magneto-inertial fusion (MIF) approach. Next we survey the fusion fuel options available. We conclude that  ${}^6\text{Li D}$  is one of the more promising approaches and discuss our reasons for this choice. Among the MIF concepts that have been proposed, we summarize the basic approach of pulsed z-pinch, which has recently emerged as a promising candidate for breakeven with currents as low as 60 MA according to Slutz and Vesey [Phys. Rev. Lett. **108**, 025003 (2012)]. A description and status of our 500 kJ pulsed power facility Charger 1 is given. We present our planned subscale fusion experiments based on diodes constructed with  ${}^6\text{LiD}$  wires and separate experiments for pulsed magnetic nozzles. A path to human piloted, fusion powered spaceflight is suggested, including secondary applications of hardware which may help subsidize development costs.